already spoken. Such parts of the rock often abound with cavities (druses), which I believe are not of original but of secondary origin. At all events, it can be shown that these cavities have been localities in which crystal growth has gone on—they constitute indeed veritable laboratories of synthetic mineralogy.

Now, in such cavities the interpenetrant crystals of quartz and felspar in this rock have found a space where they may grow and complete their outward form ; and it is curious to see how sometimes the quartz has prevailed over the felspar and a pure quartz-crystal has been produced ; while at other times the opposite effect has resulted, and a pure felspar individual has grown up. In these last cases, however much the original felspar may have been altered (kaolinized and rendered opaque), it is found to be completed by a zone of absolutely clear and unaltered felspar-substance. The result is that the cavities of the granite are lined with a series of projecting crystals of fresh quartz and clear felspar, the relations of which to the older materials in an altered condition composing the substance of the solid rock, are worthy of the most careful observation and reflection.

Those relations can be fully made out when thin sections of the rock are examined under the microscope by the aid of polarized light, and they speak eloquently of the possession by the crystals of all those curious peculiarities of which I have reminded you this evening.

By problems such as those which we have endeavoured to solve to-night, the geologist is beset at every step. The crust of our globe is built up of crystals and crystal fragments—of crystals in every stage of development, of growth, and of variation—of crystals undergoing change, decay, and dissolution. Hence the study of the natural history of crystals must always constitute one of the main foundations of geological science ; and the future progress of that science must depend on how far the experiments carried on in laboratories can be made to illustrate and explain our observations in the field.

BRITISH INSTITUTE OF PREVENTIVE MEDICINE.

A VIGOROUS attempt is being made by ignorant and prejudiced persons to prevent the establishment of a National Hygienic Institute worthy of the United Kingdom. A deputation will wait upon Sir Michael Hicks-Beach, President of the Board of Trade, on Friday, June 5, to submit to him an exact statement of the facts relating to the matter. Meanwhile, the Executive Committee has issued the following circular :—

On Monday afternoon, July 1, 1889, a meeting was held at the Mansion House, under the Presidency of Sir James Whitehead, Bart., then Lord Mayor of London, "for the purpose of hearing statements from Sir James Paget, and other representatives of scientific and medical opinion, with regard to the recent increase of rabies in this country, and the efficacy of the treatment discovered by M. Pasteur for the prevention of hydrophobia."

Although convinced of the advantages likely to accrue to the community at large by the founding of a Bacteriological Institute in England, the Committee felt that the time was not then come for establishing in England an institute similar to the "Institut Pasteur" in Paris, or the "Hygienische Institut" in Berlin. The idea, however, was not abandoned, and on December 5, 1889, an Executive Committee was appointed to take measures for the purpose of establishing in England a British Institute of Preventive Medicine.

Acting on the advice of their solicitors, Messrs. Hunters and Haynes, the Executive Committee decided to incorporate the Institute as a limited liability company, with the omission of the word "Limited," in order to impress the public with the fact that the Institute was not established for purposes of gain, but for purely charitable and scientific objects.

The application was lodged at the Board of Trade on February 13, 1891, and, shortly afterwards, a number of petitions were sent in asking the Board of Trade to withhold its license, as the objects of the Institute "clearly pointed to experiments on living animals." As Chairman of the Committee, Sir Joseph Lister then wrote to the President of the Board of Trade, showing why, in the opinion of the Committee, their opponents should not gain their point. In the first place, he pointed out that the granting of a vivisection license is not within the province of the Board of Trade, but under the control of the Secretary of State for the Home Department. In the second place, he clearly proved that it is absolutely necessary that the Institute should be licensed in the manner described, for it could not be registered under the Companies Act, 1862, without most seriously interfering with its prospects. From counsel's opinion it is evident that, should the Institute be registered as an ordinary limited liability company under the Act, it would at any time be possible for the members to wind up the company and divide the funds of the Institute ; whereas the Board of Trade, in granting the license asked for, would make it a condition that all the property of the Institute should be applied to the advancement of science and kindred subjects only, and not be distributed among the members. In this way only could security be given that the funds would be applied for the purposes intended.

This letter was posted by one of the secretaries on May 12, 1891 ; but on the same day the solicitors to the Executive Committee received a letter from the President of the Board of Trade, who, without giving any reason whatever for his decision, declined to grant the application. On the next day, however, Sir Joseph Lister received a letter in answer to that posted on May 12, in which the President of the Board of Trade intimated his willingness to receive a deputation on June 5 at 11 a.m.

Workers in bacteriological science are now labouring under considerable difficulties, as there is no place in the United Kingdom specially fitted for such research. By the establishing of this Institute, they would be placed in the best possible conditions for carrying out original investigations. Moreover, a central Institute for the systematic teaching of bacteriology would be provided, not only for medical men, but also for veterinary surgeons, chemists, agriculturists, &c.

At present, in spite of the efforts made in this direction by several medical schools, most of the English workers who wish to gain special knowledge in bacteriology, are compelled to go to the Continental laboratories for their instruction. The question, therefore, which the Board of Trade will have to decide is, whether such a state of things should continue, or whether England should have its own national bacteriological Institute. Similar Institutes have been endowed by the State in other countries; and the Board of Trade, by refusing to grant their application, would prevent a body of private gentlemen from doing what has been done at great expense by the Governments of other nations.

NOTES.

We are informed that Kew has recently acquired by purchase from Mr. F. Curtis, a descendant of William Curtis, the founder of the *Botanical Magazine*, about 1650 original drawings, chiefly of figures which appeared in that publication. They belong partly to the first series and partly to the second, from 1800 to 1826—that is to say, during the period that the magazine was edited by Dr. Sims. Many of these drawings are very beautiful, and very carefully coloured, especially those done by James

Sowerby and Sydenham Edwards; but some of the finest of their work was not reproduced in the plates. The collection also includes some of the poorest work that ever appeared in the magazine. In 1815 Sydenham Edwards seceded, and worked for the rival *Botanical Register*; Sowerby had ceased contributing, and there seems to have been a lack of novelties for illustration. Towards the end of Dr. Sims's editorship, in 1826, the *Botanical Magazine* was doubtless supplanted in a great measure by the *Botanical Register* then conducted by the vigorous Lindley. Its circulation greatly decreased, and the impression was small; hence this series is very rare. The following year, however, Sir William Hooker became editor and speedily raised both the artistic and botanical character of the magazine. Many of the plates published during the latter half of Dr. Sims's editorship are not signed, but all the drawings are, and we learn that William Hooker, the artist of the *Paradisus Londinensis*, was an occasional contributor. The collection also contains a number of unpublished drawings.

A LETTER lately received from Emin Pasha by one of his ornithological correspondents in Europe is dated from one of the larger islands on Lake Victoria Nyanza in November last. It is full of details about birds, in which, as is well known, the Pasha takes the keenest interest, and alludes especially to an apparently new *Gralline* form, with three toes, met with in that district. Emin was on the point of starting southwards into the territory near the north end of Lake Tanganyika, and is now probably somewhere in that little-known country. He had been joined by Dr. Stuhlman, a young naturalist of Hamburg. Dr. G. Hartlaub, of Bremen, has just published a memoir on the birds collected by Emin during his return to the coast with the Stanley Expedition, and his subsequent sojourn at Bagamoyo. The specimens are referred to 140 species, of which eight are described as new to science.

THE Council of the Institution of Naval Architects has resolved to award the gold medal of the Institution to Prof. V. B. Lewes for his paper on boiler deposits, read at the Institution's recent annual general meeting.

THE President of the Royal Society, who is Chairman of the Board of Visitors, will hold the annual visitation of the Royal Observatory at Greenwich on Saturday, June 6 next. The Observatory will be open for inspection at 3 p.m.

MR. JAMES E. KEELER, the Astronomer of the Lick Observatory, has lately been appointed Director of the Alleghany Observatory, in succession to Mr. S. P. Langley, Secretary of the Smithsonian Institution.

A CZECH Academy of Sciences was opened at Prague on the 18th inst., by the Archduke Charles Louis. The Latin title of the Academy is Bohemica Scientiarum, litterarum et artium Academia Imperatoris Francisci Josephi; the President is Josef Hlávka, and the General Secretary Dr. F. J. Studnička.

AN extra evening meeting of the Royal Institution will be held on Tuesday, June 2, at nine o'clock, when Dr. Charles Waldstein will give a discourse on the discovery of "The Tomb of Aristotle."

AMERICAN papers announce the death of Prof. J. E. Hilgard, late superintendent of the U.S. Coast Survey. He was born at Zweibrücken in 1825, went to America with his father in 1835, and entered the service of the U.S. Coast Survey in 1845. "His work," says the New York *Nation*, "lay directly in the line of his profession, in the improvement of methods, the determination of weights and measures, and the novel method of ascertaining the differences of longitude by telegraph. His publications on these subjects are to be found chiefly in the Coast Survey Reports. One of the most noteworthy relates to the telegraphic determination of the differences of longitude between Greenwich, Paris, and Washington. He was a delegate to the International Metric Commission in 1872, and a member of the International Bureau of Weights and Measures, of which he declined the directorship. He was an original member of the National Academy of Sciences, and for some years its Home Secretary. In 1874 he was elected President of the American Association for the Advancement of Science. He succeeded to the work of Bache in connection with the work of the Bureau of Weights and Measures, and took a leading part in preparing exact metric standards for distribution to the States and Territories."

THE recent botanical mission of Mr. D. Morris to the West Indies forms the subject of the *Kew Bulletin* for May and June. The *Bulletin* publishes the official correspondence recording the circumstances under which the Imperial Government assented to Mr. Morris's mission, and reproduces his report to the Secretary of State for the Colonies.

THE *Kew Bulletin* does good service by publishing lists of garden plants annually described in botanical and horticultural publications, both English and foreign. In Appendix II., 1891, there is a list which comprises all the new introductions recorded during 1890. "These lists," says the *Bulletin*, "are indispensable to the maintenance of a correct nomenclature, especially in the smaller botanical establishments in correspondence with Kew, which are, as a rule, only scantily provided with horticultural periodicals. Such a list will also afford information respecting new plants under cultivation at this establishment, many of which will be distributed from it in the regular course of exchange with other botanic gardens."

ON the 13th inst. the Council of the county borough of Bootle decided to appropriate and set aside for the purpose of technical education the whole of the portion of the Exchequer contribution account which may so be used under the provision of the Local Taxation (Customs and Excise) Act, 1890. The Free Library and Museum Committee were entrusted with the carrying out of a scheme submitted by them to the Council; and they have appointed Mr. John J. Ogle to the office of Organizing Secretary to the Bootle Technical School. Mr. C. H. Hunt was also appointed Registrar. The sum available is estimated at £1936 per annum.

THE following is an extract from the *Times* of last week which may interest many of our readers:—Some months ago a company, which had been formed at Wheeling, West Virginia, for the purpose of "developing" that city, began to drill a well in search of petroleum or natural gas. A depth of over 4100 feet was reached, and in this distance a dozen thick veins of coal are said to have been passed, while petroleum and gas have both been struck—though not in paying quantities—and gold quartz, iron ore, and many other minerals have been brought to the surface. The officers of the Geological Survey at Washington, according to a Wheeling despatch, have become very interested in the proceeding, and "the hole will be drilled to a depth of one mile." After this the Government will take up the work under the direction of two expert officers of the Survey, and the drilling will be continued into the earth as far as human skill can penetrate. The object is to ascertain the thermometric and magnetic conditions as far as possible.

THE Transandine Railway across the Andes, connecting the Argentine railway system with that of Chili, has been the subject of an interesting article in *Engineering*. Our contemporary in its issue of this week again deals with this fine piece of engineering, and describes the tunnelling plant used, as well as the distribution by electrical means of the power available and necessary for driving the air compressors for the Ferroux rock drills used. This line across the Andes consists of a series of tunnels and other heavy works; the tunnels had to be bored in most inaccessible regions, where the means of transport are meagre in the extreme. The whole of the plant therefore had to be designed with great care and with special reference to the unusual requirements. Weight had to be minimized, and strength and simplicity had to be carefully obtained. Water-power was available at some distance from the scene of operations; the water-power was brought to the primary stations by means of 20-inch steel pipes. On the Chilian side the primary station contained ten dynamos and two spare ones, each being of 80 horse-power, and each coupled direct to, and driven by, a Girard turbine. The electric power generated is transmitted through a cable to secondary stations, where, by means of motors, the air-compressors are operated. A similar arrangement is in use on the Argentine side, only the dynamos are of 40 horse-power, because they had to be transported over mountains on mules' backs, which made it necessary to minimize the weight. This use of the electrical transmission of power is highly interesting, the circumstances being such that, without it, the boring of the tunnels would have been a work of great expense and magnitude.

Globus has received information from Japan to the effect that there is an increasing reaction in the country against foreign influences. This is said to be especially visible in schools where European instruction is given. Two such schools, one of which formerly had 300 pupils, the other 150, have been obliged to combine their forces, having no more than 150 pupils between them. At the University of Tokio the number of native lecturers increases, while that of the foreign staff decreases.

IN the New York *Sun*, Mr. G. F. Kunz, the well-known expert in gems, has recently called attention to a property of the diamond which may serve as a means of distinguishing it from other substances. Referring to the paper of Robert Boyle "On a Remarkable Diamond that Shines in the Dark," published in the Transactions of the Royal Society in 1663, Mr. Kunz remarks that this paper has been indirectly alluded to by a number of authors, but never read. Among a quantity of facts Boyle mentions one diamond that phosphoresced simply by the heat of the hand, absorbed light by being held near a candle, and emitted light on being rubbed. He stated that many diamonds emitted light by being rubbed in the dark. The experiments made by Mr. Kunz show conclusively not only that Boyle's statement that some diamonds phosphoresce in the dark after exposure to the sunlight or an arc of electric light is true, but also that all diamonds emit light by rubbing them on wood, cloth, or metal, a property which will probably prove of great value in distinguishing between the diamond and other hard stones, as well as paste, none of which exhibit this phenomenon, and will be welcomed by the general public who do not possess the experience of the dealer in diamonds. The property is evidently not electric, or it would not be visible on being rubbed on metal.

WE learn from the *American Meteorological Journal* for April that the appropriation for the new Weather Service of the United States is 879,753 dollars, being an increase of 62,797 dollars on the amount for the current year. This is accounted for by the addition of 50,000 dollars for the proposed extension of the service in agricultural regions, and by the fact that, under the present arrangement, five of the leading officials were assigned from the army, and their salaries must henceforward be provided for from the appropriation for the new Weather Service. The Chief of the Service is to receive 4500 dollars a year. No appointment has yet been made to this position. It is quite possible that the present Chief Signal Officer will be detailed from the army for this duty, and Prof. Abbe, Prof. W. M. Davis, Prof. Nipher, and Dr. Hinrichs are some of the other prominent meteorologists mentioned as possible candidates. The same *Journal* also reports that Dr. Baker, Secretary of the Michigan State Board of Health, has investigated the cause of influenza. He stated that the germs are at all times present, but that there must be certain coincident meteorological conditions to irritate the throat and air passages sufficiently to let the germ gain an entrance to the body. These conditions were, in this instance, the excessive prevalence of north and north-east winds, and the excessive amount of ozone during the past three months.

MR. C. L. WRAGGE has issued a circular, dated February 3 last, stating that "in consequence of the rapid extension of the Meteorological Service of Australasia in connection with the Queensland Government—an extension which now embraces a large portion of the Western Pacific Ocean, New Guinea, and the Malay Archipelago—it has been determined to stop the issue of the large charts which have hitherto dealt with the meteorology of Australasia only, and to issue, instead, in the early future, a weather chart as complete as possible, embracing not only Australasia, but also the regions above indicated." Some charts have already been issued giving the isobaric lines for the region referred to, and extending southwards and eastwards to New Zealand and the New Hebrides. Isobars drawn for 20° to 30° to the eastward of Brisbane must be to a great extent problematical, and in fact this is admitted by the broken lines extending over the ocean. The information, to say the least, seems at present insufficient for the purpose, and over large tracts it is absolutely wanting; but the establishment of stations in remote islands is, of itself, very desirable.

THE other day Prof. Vambéry delivered in Edinburgh, under the auspices of the Royal Scottish Geographical Society, an interesting lecture on British civilization and influence in Asia. He had many pleasant things to say about England, but did not quite overlook her shortcomings. He said he was immensely struck by the indifference shown by the public at large to everything that concerned Asia. He had lectured in more than 20 towns in this country, and found, even amongst the middle classes, great ignorance in regard to Asiatic geography and ethnography. Asiatic languages, moreover, were greatly neglected. Germany, which had not got any territory in Asia, bestowed far greater attention upon the old world than this country. He opined that if the interest in Asia would increase in this country commensurately with its political power and influence over the various races in Asia, Britain would decidedly remain there a permanent Power which could never be ousted by any rival. He thought that there ought to be more schools for Oriental languages in this country. There was a general supposition that Britons in general could not learn foreign languages, but that was not true. The greatest linguists of our age had been British, as, for example, Lord Strangford for Turkish, and the late Sir Richard Burton and the late Prof. Palmer for Arabic. Then there were scholars like Sir James Redhouse, Sir Henry Rawlinson, Sir William White, and many others bearing evidence of the brilliant linguistic capacity of the British. He believed that nothing could be easier than to recruit in this island a goodly number of Oriental linguists for employment in various Asiatic countries.

A PAPER by Messrs. G. F. Harris and H. W. Burrows, on the Eocene and Oligocene beds of the Paris Basin, is to be issued as a separate publication by the Geologists' Association. It will be illustrated by a map and sections. The paper is the result of several years' careful study of the Parisian Tertiaries, and close communication with many eminent French geologists. The authors give an elaborate appendix, consisting of a list of the fossil Mollusca, some 3500 species, showing the range in time; the nomenclature of each species has been critically revised and brought up to date. Careful attention has also been paid to the relationship between recent and Tertiary forms. The generic names under which most of the shells are still known in this country are added as an assistance to the student.

THE Physical Society of London has published the first part of the eleventh volume of its Proceedings. Among the contents are notes on photographs of rapidly moving objects, and on the oscillating electric spark, by Mr. C. V. Boys; a formula for calculating approximately the self-induction of a coil, by Prof. John Perry; a lecture experiment illustrating the effect of heat upon the magnetic susceptibility of nickel, by Mr. Shelford Bidwell; and experiments in photo-electricity, by Prof. G. M. Minchin.

A LECTURE by Prof. A. Macalister, delivered on January 29, on the opening of the new anatomical lecture-room at Cambridge, has been published by the Cambridge University Press. The subject is "The History of the Study of Anatomy in Cambridge."

MESSRS. CHARLES GRIFFIN AND CO. have published the eighth annual issue of the "Year-book of the Scientific and Learned Societies of Great Britain and Ireland." The work is compiled from official sources, and comprises lists of the papers read during 1890 before Societies engaged in fourteen departments of research, with the names of their authors.

THE Engineering Company, publishers, New York, are issuing a new monthly magazine, entitled *Engineering*, which is to be wholly devoted to the record of industrial progress. The first two numbers have been published.

THERE are some valuable morphological notes in the Johns Hopkins University Circulars for May. Among other papers we may mention one on the structure and development of the gonophores of a certain Siphonophore belonging to the order Auronectæ (Haeckel), by W. K. Brooks and E. G. Conklin. Other papers are: preliminary notes on some new species of Squilla, by R. P. Bigelow, and a preliminary note on the anatomy and transformation of Tornaria, by T. H. Morgan.

THE "Bibliothèque Évolutioniste" is the general title of a new scientific series which is being published in Paris. The editor is M. Henry de Varigny. The first volumes are mostly translations, Wallace's "Darwinism" opening the list; but French authors are also to contribute, and works are being prepared by Messrs. A. Sabatier, of Montpellier; J. Deniker, the well-known anthropologist; Prof. Giard, and others.

IN NATURE for May 14, p. 36, line 5 from top, or "1887" read "1889."

A NEW and very beautiful silver mineral is described by Mr. F. A. Genth in the May number of the *American Journal of Science*. It was discovered by Señor Aguilar, of the San Carlos Silver Mine at Guanajuato, Mexico, and has been named after him, aguilarite. It is a sulpho-selenide of silver, of the composition $Ag_2S + Ag_2Se$, the analyses of pure crystals agreeing exactly with this formula. The crystals are iron-black in colour, and possess a most brilliant lustre. They belong to the cubic system, and consist of curious skeleton dodecahedrons, the edges of which are perfect, while the centres of the faces are more or less worn or imperfectly developed. These dodecahedrons are frequently elongated in such a manner as to resemble either tetragonal prisms terminated by pyramids of the opposite order, or hexagonal prisms terminated by rhombohedral planes. They generally occur in interlaced and closely aggregated groups, the individual crystals of which attain a size of a centimetre or more in diameter. They are for the most part embedded in colourless calcite, which may readily be removed from them by means of dilute acetic acid; frequently a little quartz is associated with them. The crystals are readily sectile and malleable, and their hardness is only 2·5. Their specific gravity is 7·586. When heated in an open tube to low redness, gradually increasing to bright redness, they yield metallic silver, together with a slight sublimate of selenium, and slender needles of selenious and sulphuric oxides, which latter forms, with a little of the silver, silver sulphate. In many of the specimens of aguilarite examined, the crystals were observed to be penetrated in a remarkable manner by round holes, and they also frequently exhibited deposits of pure metallic silver upon their faces.

SEVERAL of the simpler sulphides of the organic radicles have been found to occur naturally in the crude petroleum oil of Ohio by Messrs. Mabery and Smith, who describe the mode adopted for their isolation in the current number of the *American Chemical Journal*. As far as they are aware, these alkyl sulphides have never previously been found in nature. When the higher boiling fractions of the distilled oil are agitated with oil of vitriol, these sulphur compounds are taken up by the sulphuric acid, and, upon subsequently neutralizing the acid solution with slaked lime, unstable calcium salts are obtained, which are readily decomposed by distillation in steam, which carries over the sulphides without decomposition. By employing these reactions upon a large scale, and afterwards subjecting the mixed sulphides to a rigorous fractional distillation under reduced pressure (150 mm. being the most convenient working pressure), the following sulphides have been isolated: methyl sulphide, $(CH_3)_2S$; ethyl sulphide, $(C_2H_5)_2S$; normal propyl sulphide, $(C_3H_7)_2S$; normal and iso-butyl sulphides, $(C_4H_9)_2S$; amyl sulphide, $(C_5H_{11})_2S$; hexyl sulphide, $(C_6H_{13})_2S$; and a few other sulphides of mixed radicles. Most of these sulphides were obtained in the pure state by treating the products of the fractionation with mercuric chloride, and thus obtaining crystals of the addition compounds of the type $(CH_3)_2S \cdot HgCl_2$, and subsequently decomposing these crystals of the mercury compounds with sulphuretted hydrogen.

THE additions to the Zoological Society's Gardens during the past week include a Barbary Ape (*Macacus inuus* ♂) from North Africa, presented by the Rev. G. H. Watkins; a Diuca Finch (*Diuca grisea*), two Gay's Finches (*Phrygilus gayi*) from Chili, two De Filippi's Meadow Starlings (*Sturnella defilippi*) from La Plata, presented by Mr. Charles G. Sharpe; two Bankiva Jungle Fowls (*Gallus bankiva* ♂ ♀) from India, presented by Captain George James; a Common Rhea (*Rhea americana*) from South America, presented by Mr. R. P. Houston; an Algerian Tortoise (*Testudo mauritanica*) from North Africa, presented by Mrs. Margaret Clarke; a Black-eared Marmoset (*Hapale penicillata*) from South-east Brazil, presented by Mr. Aubrey Lace; a Capybara (*Hydrochœrus capybara*), a Brown Milvago (*Milvago chimango*), a Violaceous Night Heron (*Nycticorax violaceus*) from South America, two Blue-bearded Jays (*Cyanocorax cyanopogon*) from Para, four Crested Screamers (*Chauna chavaria*) from Buenos Ayres, deposited; two Variegated Sheldrakes (*Tadorna variegata*) from New Zealand, two Larger Tree Ducks (*Dendrocygna major*) from India, purchased; two Japanese Deer (*Cervus sika* ♂ ♀), a Chinchilla (*Chinchilla lanigera*), an African Wild Ass (*Equus tæniopus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE DRAPER CATALOGUE OF STELLAR SPECTRA.—Vol. xxvii. of the *Annals of the Astronomical Observatory of Harvard College* contains a catalogue of the spectra of 10,351 stars, nearly all of them north of the parallel of declination − 25°, photographed with the 8-inch Bache telescope. As the work forms a